

WE CLAIM:

1. A device for monitoring and reporting at least one parameter of an electric circuit, said device comprising:
 - at least one sensor coupled with said electric circuit and operative to sense at least one electrical parameter in said electric circuit and generate at least one analog signal indicative thereof;
 - an analog to digital converter coupled with said at least one sensor and operative to convert said at least one analog signal to at least one digital signal representative of said at least one analog signal;
 - a processor coupled with said analog to digital converter and operative to generate at least one computed value from said at least one digital signal;
 - a local display coupled with said processor and operative to report said at least one computed value;
 - a communications port coupled with said processor and a digital network and operative to facilitate reporting of said at least one computed value onto said digital network; and
 - a summing module coupled with said digital network, said summing module operative to receive said at least one computed value and further sum said at least one computed value to a second value.
2. The device of claim 1 further comprising a multiplexer coupled between said at least one sensor and said analog to digital converter.
3. The device of claim 1, wherein said analog to digital converter comprises first and second analog to digital converters, said first analog to digital converter being operative to convert a voltage analog signal to at least one digital sample and said second analog to digital converter being operative to convert a current analog signal to at least one digital sample.

4. The device of claim 1, wherein said local display is operative to display said at least one electrical parameter.
5. The device of claim 1, further comprising a time synchronization receiver, said processor operative to receive a first time synchronization signal from said time synchronization receiver and further operative to alter a timing clock signal based on said first time synchronization signal.
6. The device of claim 5 further comprising a local synchronization circuit, said local synchronization circuit operative to output said timing clock signal to said processor.
7. The device of claim 5, wherein said first time synchronization signal comprises a network time signal.
8. The device of claim 5, wherein said first time synchronization signal comprises a second time synchronization signal from a second device coupled with said digital network.
9. The device of claim 8, wherein said second time synchronization signal from said second device is transmitted to a plurality of devices coupled with said digital network.
10. The device of claim 5, wherein said time synchronization receiver comprises a GPS receiver wherein said GPS receiver is operative to receive a GPS signal.
11. The device of claim 10, wherein said GPS receiver wirelessly receives said GPS signal.
12. The device of claim 5, wherein said first time synchronization signal is computed from a fundamental line frequency computation of said electric circuit.
13. The device of claim 1 further comprising a remote module, said remote module operative to allow a second device to remotely connect to said device over said digital network.

14. The device of claim 13, wherein said second device comprises at least one computer.
15. The device of claim 13, wherein said second device comprises a meter.
16. The device of claim 13, wherein said second device comprises a protection device.
17. The device of claim 13, wherein said second device further comprises a second remote module, said second remote module operative to allow said device to remotely connect to a third device over the digital network.
18. The device of claim 13, wherein said second device comprises a circuit breaker, said circuit breaker comprising a second communications port coupled with said digital network.
19. The device of claim 1, wherein said digital network comprises an Ethernet network, said communications port comprising an Ethernet port.
20. The device of claim 1, wherein said digital network comprises a digital data transmission network.
21. The device of claim 1, wherein said digital network comprises a Transmission Control Protocol/Internet Protocol ("TCP/IP") communications network.
22. The device of claim 1, wherein said digital network comprises a fiber optic data communications network.
23. The device of claim 1 further wherein said processor is operative to receive said at least one digital signal and provide digital data representative of said at least one electrical parameter.
24. The device of claim 23 further wherein said device is operative to transmit said digital data onto said digital network.

25. The device of claim 23, wherein said digital data is transmitted in substantially real time.
26. The device of claim 1, said processor further comprising an inverse current module, said inverse current module operative to determine a fault condition on said electric circuit.
27. The device of claim 26, wherein said fault condition is determined by calculating the square of the current multiplied by the duration as expressed by the equation I^2T .
28. The device of claim 1, wherein said device is further coupled with at least a second electric circuit, said device operative to perform an overcurrent protection function.
29. The device of claim 1 further comprising at least one second communication port.
30. The device of claim 29, wherein said at least one second communication port comprises an Ethernet port.
31. The device of claim 29, wherein said at least one second communication port is coupled with a second device.
32. The device of claim 1 further comprising a second communication port coupled with said digital network and a third communication port coupled with said digital network.
33. The device of claim 32, wherein said second communication port and said third communication port each comprise at least one RS232 port.
34. The device of claim 32, wherein said second communication port and said third communication port comprise at least one RS485 port.
35. The device of claim 32, wherein said second communication port comprises an RS232 port and said third communication port comprises a RS485 port.

36. The device of claim 1 wherein said communications port further is operative to scale said digital network for communications among a plurality of said device for monitoring and reporting at least one parameter of an electric circuit, without substantially degrading real time communications among any at least two of said device for monitoring and reporting at least one parameter of an electric circuit.
37. The device of claim 1, wherein said communications port enables centralized simultaneous knowledge of a status of a plurality of said device for monitoring and reporting at least one parameter of an electric circuit.
38. The device of claim 1, wherein said communications port enables substantially simultaneous real time reporting of said at least one computed value over said network from a plurality of said devices without any one of said plurality of devices waiting for another of said plurality of devices.
39. The device of claim 1, wherein said digital network comprises a wireless network.
40. The device of claim 1, wherein said communication port is further operative to communicate with substantially simultaneous connections with a plurality of power monitoring devices over said digital network.
41. The device of claim 1, wherein said summing module comprises a phasor summing module.
42. The device of claim 1, wherein said summing module is coupled with said processor.